

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization International Bureau



(43) International Publication Date
7 July 2005 (07.07.2005)

PCT

(10) International Publication Number
WO 2005/061634 A1

- (51) International Patent Classification⁷: **C09D 11/00**, 11/10
- (74) Agents: MAYALL, John et al.; Avecia Inkjet Limited, Intellectual Property Group, PO Box 42, Hexagon Tower, Blackley, Manchester M9 8ZS (GB).
- (21) International Application Number: PCT/GB2004/005050
- (22) International Filing Date: 2 December 2004 (02.12.2004)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data: 0329597.9 20 December 2003 (20.12.2003) GB
- (71) Applicant (for all designated States except US): AVECIA INKJET LIMITED [GB/GB]; PO Box 42, Hexagon Tower, Blackley, Manchester M9 8ZS (GB).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): OVEREND, Andrew, Stuart [GB/GB]; P.O. Box 42, Hexagon House, Blackley, Manchester M9 8ZS (GB). CORDWELL, Janette [GB/GB]; P.O. Box 42, Hexagon House, Blackley, Manchester M9 8ZS (GB). PARRY, Matthew, Lloyd [GB/GB]; Quarry Road East, Bebington, Wirral CH63 3JW (GB).
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: PARTICLE BEAM CURABLE INK JET INKS

$$c\% + 0.628 \left(\frac{d\%}{\sin 60} + \frac{e\%}{\tan 60} \right) \quad (I)$$

WO 2005/061634 A1

(57) Abstract: A non-aqueous, substantially solvent-free and photoinitiator-free, particle beam curable ink having a viscosity less than 30m Pa.s at 60 °C, comprising: (j) a colorant; and (ii) a mixture of (meth)acrylate compounds; wherein: (a) the colorant is present in the ink in an amount of 0.1 to 14.9 % by weight relative to the total weight of ink; and (b) the mixture of (meth)acrylate compounds comprises c % of one or more mono (meth)acrylate compounds, d % of one or more di (meth)acrylate compounds and e % of one or more compounds having three or more (meth)acrylate groups, wherein the values of c %, d % and e % are by weight relative to the total weight of the mono (meth)acrylate compounds, di (meth)acrylate compounds and compounds having three or more (meth)acrylate groups and are such that the value of: Formula (I) is less than or equal to 60: Formula (I). Said inks are especially useful as ink jet printing inks. The inks are especially suitable for food contact applications and when printed and cured demonstrate good fat resistance and low levels of leaching to foodstuffs.